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PATENT APPLICATION

HEWLETT-PACKARD COMPANY
Intellectual Property Administration
P.O. Box 272400
Fort Collins, Colorado 80527-2400ATTORNEY DOCKET NO. 200314366-1**IN THE
UNITED STATES PATENT AND TRADEMARK OFFICE**

Inventor(s): Horn et al.

Confirmation No.: 3276

Application No.: 10/694,145

Examiner: Anh T. N Vo

Filing Date: 10/27/03

Group Art Unit: 2861

Title: FEATURES IN SUBSTRATES AND METHODS OF FORMING

Mail Stop Appeal Brief-Patents
Commissioner For Patents
PO Box 1450
Alexandria, VA 22313-1450**TRANSMITTAL OF APPEAL BRIEF**Transmitted herewith is the Appeal Brief in this application with respect to the Notice of Appeal filed on 10/11/06.

The fee for filing this Appeal Brief is (37 CFR 1.17(c)) \$500.00.

(complete (a) or (b) as applicable)

The proceedings herein are for a patent application and the provisions of 37 CFR 1.136(a) apply.

☐ (a) Applicant petitions for an extension of time under 37 CFR 1.136 (fees: 37 CFR 1.17(a)-(d)) for the total number of months checked below:☐ 1st Month
\$120☐ 2nd Month
\$450☐ 3rd Month
\$1020☐ 4th Month
\$1580☐ The extension fee has already been filed in this application.☒ (b) Applicant believes that no extension of time is required. However, this conditional petition is being made to provide for the possibility that applicant has inadvertently overlooked the need for a petition and fee for extension of time.

Please charge to Deposit Account 08-2025 the sum of \$ 500 . At any time during the pendency of this application, please charge any fees required or credit any over payment to Deposit Account 08-2025 pursuant to 37 CFR 1.25. Additionally please charge any fees to Deposit Account 08-2025 under 37 CFR 1.16 through 1.21 inclusive, and any other sections in Title 37 of the Code of Federal Regulations that may regulate fees.

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Typed Name: Doreen Zabinski

Signature: 

Respectfully submitted,

Horn et al.

By 

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PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of:)	Examiner: Anh T N Vo
Horn et al.)	
Serial No.: 10/694,145)	Art Unit: 2861
Filed: October 27, 2003)	
For: FEATURES IN SUBSTRATES AND METHODS OF FORMING)	
Date of Final Office Action:)	Attorney Docket No.:
July 19, 2006)	200314366-1
Notice of Appeal Filed:)	
October 11, 2006)	

December 11, 2006

APPEAL BRIEF

Mail Stop Appeal Brief
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

This Appeal Brief is timely provided to support the Notice of Appeal filed October 11, 2006.

CERTIFICATE OF FACSIMILE

Date of Deposit: December 11, 2006

I hereby certify that these papers are being transmitted to The Patent and Trademark Office facsimile number (571) 273-8300 on December 11, 2006.


Doreen Zabinski

12/13/2006 EFLORES 00000042 082025 10694145

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1. Real Party in Interest:

The real party in interest is Hewlett-Packard Development Company, LP, a limited partnership established under the laws of the State of Texas and having a principal place of business at 20555 S.H. 249 Houston, TX 77070, USA.

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2. Related Appeals and Interferences

There are no other prior and/or pending appeals, interferences, or judicial proceedings that are related to, directly affect, or that will be directly affected by or have a bearing on the Board's decision.

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3. Status of Claims

Claims 6, 34-38 are pending in the application.

Claims 6, 34-38 stand rejected.

Claims 1-5 and 7-33 were previously canceled in the application.

The rejections of claims 6, 34-38 are appealed.

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4. Status of Amendments

No Amendments were filed subsequent to the Final Office Action.

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5. Summary of Claimed Subject Matter

Independent Claim 6

Independent claim 6 is directed to a fluid ejecting device. Claim 6 recites a substrate having a feature formed by a first process that removes substrate material from the substrate, the feature extending into the substrate and within the substrate along an axis, where a cross-section of the feature taken transverse the axis has an upper terminus proximate a first substrate surface, the upper terminus having a first profile. (See, specification, Figs. 4a-4d, 5, 6, 6a, 7-7b, paragraphs [0034] and [0038]).

Claim 6 further recites where the upper terminus is formed to have a second profile different from the first profile by a second different process that removes additional substrate material from the substrate and also removes debris created by the first substrate removal process and where the feature comprises a fluid-handling slot. (See, specification Figs. 4e-4h, 5a, 6b, 7c-7d, paragraphs [0012], [0033], [0039] and [0050]).

Independent Claim 34

Independent claim 34 is directed to a fluid-ejecting device. Claim 34 recites a substrate comprising at least a first substrate surface and a second substrate surface, a fluid-handling slot formed by at least two substrate removal processes and extending through the substrate between the first substrate surface and the second substrate surface, where the first substrate removal process comprises using a laser and the second substrate removal process comprises using abrasive particles. (See, specification, Figs. 4a-4h and paragraphs [0033], [0036]-[0040], [0049] and [0050]).

Claim 34 further recites an orifice layer positioned over the first substrate surface, the orifice layer having multiple firing nozzles formed therein, at least some of the nozzles being in fluid flowing relation with the fluid-handling slot. (See, Fig. 3, paragraphs [0027], [0028],

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[0030] and [0032]). Continuing, claim 34 recites wherein at least one of the first substrate surface and the second substrate surface being processed by at least one of the removal processes prior to the orifice layer being positioned over the first substrate surface, at least in part, to reduce an incidence of debris occluding ink flow through individual nozzles. (See, specification, paragraphs [0022] and [0048]-[0050]).

Independent Claim 38

Independent claim 38 is directed to a micro electro mechanical systems device. Claim 38 recites a substrate for supporting overlying layers. (See, specification, paragraph [0027]). Claim 38 further recites at least one feature formed in the substrate, the feature being formed with at least a first substrate removal process and a second different substrate removal process. (See, specification, paragraph [0033]).

Claim 38 also recites wherein the second different substrate removal process also removes debris created by the first substrate removal process. (See, specification, paragraph [0050]). Claim 38 further recites wherein the first substrate removal process comprises using a laser beam and the second substrate removal process comprises directing abrasive particles toward the substrate. (See, specification, paragraphs [0037] and [0040]).

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6. Grounds of Rejection to be Reviewed on Appeal

The following grounds of rejection are to be reviewed on appeal:

I. Whether claim 6 is unpatentable under 35 USC §103(a) over Boyle et al. (Pub. No. US 2002/017089111) in view of Maggs et al. (US Pat. 3,867,217).

II. Whether claims 34-38 are unpatentable under 35 U.S.C. §103(a) over Hall et al. (US 6,902,867) in view of Boyle et al. (US 2002/0170891) and further in view of Maggs et al. (US Pat. 3,867,217).

III. Whether claims 6 and 34-38 are unpatentable under 35 USC §103(a) over Baughman et al. (US Pat. 5,608,436) in view of Boyle et al. (US 2002/0170891) and further in view of Maggs et al. (US Pat. 3,867,217).

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7. Argument

I. Whether claim 6 is unpatentable under 35 USC §103(a) over Boyle et al. (Pub. No. US 2002/017089111) in view of Maggs et al. (US Pat. 3,867,217).

Independent claim 6

Claim 6 recites a fluid-handling slot formed by a first process and a second different process where the second different process removes additional substrate material from the substrate to form an upper terminus having a second profile different from a first profile and the second process also removes debris created by the first substrate removal process. Boyle and Maggs fail to teach or suggest this feature and thus claim 6 patentably distinguishes over the references of record.

The Boyle Reference

Boyle teaches laser machining to form a via. (Boyle, Abstract). Machining may be performed in multiple passes. (Boyle, Abstract). The Office Action relies upon Figures A-B and 1-2 of Boyle. Fig. A illustrates prior art accumulation of debris and molten material at a via outlet. (Boyle, paragraph 6). Typically, the debris cannot be removed by conventional washing techniques. (Boyle, paragraph 6).

Fig. B illustrates a three-step process in which a laser is used to machine a via structure with rough tapered walls. (Boyle, paragraph 12). The sidewalls are then cleaned in a second step. (Boyle, paragraph 12). Finally, an insulating layer is created on the internal via walls in the third step. (Boyle, paragraph 12). Thus, Boyle does not teach or suggest a second different process that removes additional substrate material from the substrate to form an upper terminus having a second profile different from a first profile and the second process also removes debris created by the first substrate removal process.

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The Maggs Reference

Maggs does not cure the shortcomings of Boyle. Maggs teaches a technique for forming thin-film circuits by laser machining in which a gold conductor layer is first covered with a copper protective layer. (Maggs, Abstract). After machining, the laser-machined gaps are cleaned by a fluid stream containing abrasive particles, during which the protective layer shields the gold conductors. (Maggs, Abstract emphasis added). Thereafter, the protective layer is removed by selective etching. (Maggs, Abstract). Significantly, the cleaning by a fluid stream taught by Maggs is not a substrate removal process.

The Final Office Action provides "[i]t would have been obvious to one skilled in the art at the time the invention was made to employ the cleaning process as suggested by Maggs et al to remove debris of Boyle for the purpose of giving dependable cleaning without contaminating the substrate." (Final Office Action at page 3). However, the combination of Boyle and Maggs does not yield a fluid-handling slot formed by a first process and a second different process where the second different process removes additional substrate material from the substrate to form an upper terminus having a second profile different from a first profile and the second process also removes debris created by the first substrate removal process as recited in claim 6. In fact, the combination of Boyle (a three step process) with the cleaning process of Maggs results in at least a four step process.

MPEP §2143.03 provides, in pertinent part:

To establish prima facie obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. In re Royka, 490 F.2d 981, 180 USPQ 580 (CCPA 1974). "All words in a claim must be considered in judging the patentability of that claim against the prior art." In re Wilson, 424 F.2d 1382, 1385, 165 USPQ 494, 496 (CCPA 1970).

With respect to the subject application, claim 6 recites a fluid-handling slot formed by a first process and a second different process where the second different process removes additional substrate material from the substrate to form an upper terminus having a second

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profile different from a first profile and the second process also removes debris created by the first substrate removal process. Boyle and Maggs fail to teach or suggest this feature and thus even when combined, they fail to support a proper obviousness rejection. Therefore, the rejection is improper and should be reversed. Accordingly, claim 6 patentably distinguishes over the references of record and is in condition for allowance.

II. Whether claims 34-38 are unpatentable under 35 U.S.C. §103(a) over Hall et al. (US 6,902,867) in view of Boyle et al. (US 2002/0170891) and further in view of Maggs et al. (US Pat. 3,867,217).

Independent Claim 34

Claim 34 recites a substrate comprising at least a first substrate surface and a second substrate surface, a fluid-handling slot formed by at least two substrate removal processes and extending through the substrate between the first substrate surface and the second substrate surface, where the first substrate removal process comprises using a laser and the second substrate removal process comprises using abrasive particles. Claim 34 further recites a substrate surface processed by at least one of the removal processes prior to the orifice layer being positioned over the first substrate to reduce an incidence of debris occluding ink flow through individual nozzles. Hall, Boyle and Maggs, individually and/or in combination, fail to teach, suggest or make obvious these features and fail to establish a prima facie obviousness rejection. Thus, claim 34 patentably distinguishes over the references of record.

In particular, Hall teaches a method for making ink feed vias. (Hall, Abstract). The ink feed vias 14 are etched through the entire thickness of the semiconductor substrate 32 and are in fluid communication with ink supplied from an ink supply container, ink cartridge or remote ink supply. (Hall, col. 5, lines 7-9). As acknowledged in the Office Action, Hall does not teach or suggest (1) a first substrate removal process that comprises using a laser and a second substrate removal process that comprises using abrasive particles; or (2) a substrate surface processed to reduce an incidence of debris occluding ink flow through individual nozzles. (Final Office Action at pages 3-4).

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As discussed above, Boyle teaches laser machining to form a via. (Boyle, Abstract). Machining may be performed in multiple passes. (Boyle, Abstract). The Office Action relies upon Figures A-B and 1-2 of Boyle. Fig. A illustrates prior art accumulation of debris and molten material at a via outlet. (Boyle, paragraph 6). Typically, the debris cannot be removed by conventional washing techniques. (Boyle, paragraph 6). Boyle does not teach a second substrate removal process that comprises directing abrasive particles and thus fails to support the rejection.

Maggs does not cure the shortcomings of Hall and Boyle. Maggs teaches the use of a fluid stream containing abrasive particles to clean laser-machined gaps. (Maggs, Abstract). As noted previously, cleaning by a fluid stream is not a substrate removal process.

Thus, Hall, Boyle and Maggs, individually and/or in combination, fail to teach, suggest or make obvious a fluid-ejecting device comprising at least a first substrate surface and a second substrate surface, a fluid-handling slot formed by at least two substrate removal processes and extending through the substrate between the first substrate surface and the second substrate surface, where the first substrate removal process comprises using a laser and the second substrate removal process comprises using abrasive particles.

Accordingly, the §103 rejections of claim 34 are not supported by Hall, Maggs and/or Boyle since each and every feature of claim 34 is not taught. Thus even when combined, they fail to support a proper obviousness rejection. Therefore, the rejection is improper and should be reversed. Accordingly, claim 34 patentably distinguishes over the references of record and is in condition for allowance. Further, dependent claims 35-37 also patentably distinguish over the references of record and are in condition for allowance.

Independent Claim 38

Claim 38 recites a micro electro mechanical systems device comprising a substrate for supporting overlying layers; and, at least one feature formed in the substrate, the feature being formed with at least a first substrate removal process and a second different substrate removal

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process, wherein the second different substrate removal process also removes debris created by the first substrate removal process and wherein the first substrate removal process comprises using a laser beam and the second substrate removal process comprises directing abrasive particles toward the substrate. Hall, Boyle and Maggs, individually and/or in combination, fail to teach, suggest or make obvious these features and fail to establish a *prima facie* obviousness rejection. Thus, claim 38 patentably distinguishes over the references of record.

Hall teaches a method for making ink feed vias. (Hall, Abstract). The ink feed vias 14 are etched through the entire thickness of the semiconductor substrate 32 and are in fluid communication with ink supplied from an ink supply container, ink cartridge or remote ink supply. (Hall, col. 5, lines 7-9). Hall does not teach or suggest a first substrate removal process comprises using a laser beam and a second substrate removal process that comprises directing abrasive particles. Hall further does not teach or suggest the second substrate removal process also removes debris created by the first substrate removal process as recited in claim 38 of the subject application. Therefore, these limitations are not taught or suggested and Hall fails to support the rejection.

Boyle teaches laser machining to form a via. (Boyle, Abstract). Machining may be performed in multiple passes. (Boyle, Abstract). The Office Action relies upon Figures A-B and 1-2 of Boyle. Fig. A illustrates prior art accumulation of debris and molten material at a via outlet. (Boyle, paragraph 6). Typically, the debris cannot be removed by conventional washing techniques. (Boyle, paragraph 6). Boyle does not teach a second substrate removal process that comprises directing abrasive particles.

Maggs does not cure the shortcomings of Hall and Boyle. Maggs teaches the use of a fluid stream containing abrasive particles to clean laser-machined gaps. (Maggs, Abstract). As noted previously, cleaning by a fluid stream is not a substrate removal process.

Applicants' representative respectfully submits that the Final Office Action does not provide any reference that teaches, suggests or makes obvious the limitation of claim 38 that the

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second different substrate removal process also removes debris created by the first substrate removal process.

Thus, Hall, Boyle and Maggs, individually and/or in combination, fail to teach, suggest or make obvious the micro electro mechanical systems device recited in claim 38. Accordingly, the section 103 rejections of claim 38 are not supported by Hall, Maggs and Boyle since each and every feature of claim 38 is not taught. The rejection should be reversed. Thus, claim 38 patentably distinguishes over the references of record and is in condition for allowance.

III. Whether claims 6 and 34-38 are unpatentable under 35 USC §103(a) over Baughman et al. (US Pat. 5,608,436) in view of Boyle et al. (US 2002/0170891) and further in view of Maggs et al. (US Pat. 3,867,217).

Independent claim 6

Claim 6 recites a fluid-handling slot formed by a first process and a second different process where the second different process removes additional substrate material from the substrate to form an upper terminus having a second profile different from a first profile and the second process also removes debris created by the first substrate removal process. Baughman, Boyle and Maggs, individually and/or in combination, fail to teach or suggest this feature and thus claim 6 patentably distinguishes over the references of record.

The Final Office Action includes a rejection of claim 6 under 35 USC §103(a) as being unpatentable over Baughman in view of Boyle and further in view of Maggs. However, the claim limitations of claim 6 are not addressed with respect to this rejection. (See, Final Office Action at pages 4 – 6). More specifically, the Final Office Action does provide any rationale or reasoning for the rejection of claim 6 under 35 USC §103(a) as being unpatentable over Baughman in view of Boyle and further in view of Maggs.

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With respect to Baughman, Applicant respectfully refers to column 5 starting at line 19 where Baughman describes Figures 4A-D and the etching process used. Applicant finds no discussion of a fluid-ejection device formed in a manner to reduce debris. Debris is not even mentioned by Baughman. Curiously, the Office Action provides:

The applicants argues that Baughman fails to mention the debris. The argument is not persuasive because removing debris is an inherent step in a process of making a slot since drilling a hole on a substrate inherently produce debris. (Final Office Action at page 6).

Thus, it appears that the Office Action is relying upon inherency and not upon an explicit teaching or suggestion of Baughman. Even accepting the Office Action's premise that drilling a hole on a substrate inherently produces debris, Baughman does not teach or suggest a fluid-handling slot formed by a first process and a second different process where the second different process removes additional substrate material from the substrate to form an upper terminus having a second profile different from a first profile and the second process also removes debris created by the first substrate removal process.

As discussed above, Boyle teaches laser machining to form a via. (Boyle, Abstract). Machining may be performed in multiple passes. (Boyle, Abstract). The Office Action relies upon Figures A-B and 1-2 of Boyle. Fig. A illustrates prior art accumulation of debris and molten material at a via outlet. (Boyle, paragraph 6). Typically, the debris cannot be removed by conventional washing techniques. (Boyle, paragraph 6). Boyle does not teach a fluid-handling slot formed by a first process and a second different process where the second different process removes additional substrate material from the substrate to form an upper terminus having a second profile different from a first profile and the second process also removes debris created by the first substrate removal process.

Further, Maggs does not cure the shortcomings of Baughman and Boyle. Maggs teaches the use of a fluid stream containing abrasive particles to clean laser-machined gaps. (Maggs, Abstract). As noted previously, cleaning by a fluid stream is not a substrate removal process.

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Therefore, the §103 rejection of claim 6 is not supported by the combination of Baughman, Maggs and Boyle since each and every feature of claim 6 is not taught or suggested. Therefore, a prima facie obviousness rejection has not been established and the rejection should be reversed. Accordingly, claim 6 patentably distinguishes over the references of record and is in condition for allowance.

Independent Claim 34

Claim 34 recites a substrate comprising at least a first substrate surface and a second substrate surface, a fluid-handling slot formed by at least two substrate removal processes and extending through the substrate between the first substrate surface and the second substrate surface, where the first substrate removal process comprises using a laser and the second substrate removal process comprises using abrasive particles. Claim 34 further recites a substrate surface processed by at least one of the removal processes prior to the orifice layer being positioned over the first substrate to reduce an incidence of debris occluding ink flow through individual nozzles. Baughman, Boyle and Maggs, individually and/or in combination, fail to teach, suggest or make obvious these features. Thus, claim 34 patentably distinguishes over the references of record.

Baughman, as discussed in greater detail above describes an etching process. Baughman fails to teach or suggest a fluid-handling slot formed by a first process and a second different process where the first substrate removal process comprises using a laser and the second substrate removal process comprises using abrasive particles, and at least one of the first substrate surface and the second substrate surface being processed by at least one of the removal processes prior to the orifice layer being positioned over the first substrate to reduce an incidence of debris occluding ink flow through individual nozzles.

As discussed above, Boyle teaches laser machining to form a via. (Boyle, Abstract). Machining may be performed in multiple passes. (Boyle, Abstract). The Office Action relies upon Figures A-B and 1-2 of Boyle. Fig. A illustrates prior art accumulation of debris and molten material at a via outlet. (Boyle, paragraph 6). Typically, the debris cannot be removed

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by conventional washing techniques. (Boyle, paragraph 6). Boyle does not teach a second substrate removal process that comprises directing abrasive particles.

Maggs does not cure the shortcomings of Baughman and Boyle. Maggs teaches the use of a fluid stream containing abrasive particles to clean laser-machined gaps. (Maggs, Abstract). As noted previously, cleaning by a fluid stream is not a substrate removal process.

Applicants' representative respectfully submits that the Office Action does not provide any reference that teaches, suggests or makes obvious the limitation of claim 34 that at least one of the first substrate surface and the second substrate surface being processed by at least one of the removal processes prior to the orifice layer being positioned over the first substrate to reduce an incidence of debris occluding ink flow through individual nozzles.

Accordingly, the §103 rejection of claim 34 is not supported by the combination of Baughman, Maggs and Boyle since each and every feature of claim 34 is still not taught. Therefore, a prima facie obviousness rejection has not been established and the rejection should be reversed. Thus, claim 34 patentably distinguishes over the references of record and is in condition for allowance. Further, dependent claims 35-37 also patentably distinguish over the references of record and are in condition for allowance.

Independent Claim 38

Claim 38 recites a micro electro mechanical systems device comprising a substrate for supporting overlying layers; and, at least one feature formed in the substrate, the feature being formed with at least a first substrate removal process and a second different substrate removal process, wherein the second different substrate removal process also removes debris created by the first substrate removal process and wherein the first substrate removal process comprises using a laser beam and the second substrate removal process comprises directing abrasive particles toward the substrate. Baughman, Boyle and Maggs, individually and/or in combination, fail to teach, suggest or make obvious these features. Thus, claim 38 patentably distinguishes over the references of record.

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Baughman, as discussed in greater detail above, describes an etching process. Baughman fails to teach or suggest a fluid-handling slot formed by a first process and a second different process where the first substrate removal process comprises using a laser beam and the second substrate removal process comprises directing abrasive particles toward the substrate where the second different substrate removal process also removes debris created by the first substrate removal process.

Boyle teaches laser machining to form a via. (Boyle, Abstract). Machining may be performed in multiple passes. (Boyle, Abstract). The Office Action relies upon Figures A-B and 1-2 of Boyle. Fig. A illustrates prior art accumulation of debris and molten material at a via outlet. (Boyle, paragraph 6). Typically, the debris cannot be removed by conventional washing techniques. (Boyle, paragraph 6). Boyle does not teach a second substrate removal process that comprises directing abrasive particles.

Maggs does not cure the shortcomings of Baughman and Boyle. Maggs teaches the use of a fluid stream containing abrasive particles to clean laser-machined gaps. (Maggs, Abstract). As noted previously, cleaning by a fluid stream is not a substrate removal process.

Applicants' representative respectfully submits that the Office Action does not provide any reference that teaches, suggests or makes obvious the limitation of claim 38 that the second different substrate removal process also removes debris created by the first substrate removal process.

Thus, Baughman, Boyle and Maggs, individually and/or in combination, fail to teach, suggest or make obvious the micro electro mechanical systems device recited in claim 38. Therefore, a prima facie obviousness rejection has not been established and the rejection should be reversed since each and every feature of claim 38 is not taught or suggested. Accordingly, claim 38 patentably distinguishes over the references of record and is in condition for allowance.

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Conclusion

For the reasons set forth above, a prima facie obviousness rejection has not been established for any claim. All rejections have been shown to be improper. Appellant respectfully believes that pending claims 6 and 34-38 patentably and unobviously distinguish over the references of record and that the rejections should be withdrawn. Appellant respectfully requests that the Board of Appeals overturn the Examiner's rejections and allow all pending claims. An early allowance of all claims is earnestly solicited.

Respectfully submitted,

DEC. 11, 2006
Date

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Claims Appendix

1-5. (Canceled).

6. A fluid ejecting device comprising:

a substrate having a feature formed by a first process that removes substrate material from the substrate, the feature extending into the substrate and within the substrate along an axis, where a cross-section of the feature taken transverse the axis has an upper terminus proximate a first substrate surface, the upper terminus having a first profile; and,

where the upper terminus is formed to have a second profile different from the first profile by a second different process that removes additional substrate material from the substrate and also removes debris created by the first substrate removal process and where the feature comprises a fluid-handling slot.

7-33. (Canceled).

34. A fluid-ejecting device comprising:

a substrate comprising at least a first substrate surface and a second substrate surface, a fluid-handling slot formed by at least two substrate removal processes and extending through the substrate between the first substrate surface and the second substrate surface, where the first substrate removal process comprises using a laser and the second substrate removal process comprises using abrasive particles; and,

an orifice layer positioned over the first substrate surface, the orifice layer having multiple firing nozzles formed therein, at least some of the nozzles being in fluid flowing relation with the fluid-handling slot, wherein at least one of the first substrate surface and the second substrate surface being processed by at least one of the removal processes prior to the orifice layer being positioned over the first substrate surface, at least in part, to reduce an incidence of debris occluding ink flow through individual nozzles.

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35. The fluid-ejecting device of claim 34, wherein the fluid-handling slot is formed utilizing three distinct substrate removal processes.
36. The fluid-ejecting device of claim 34, wherein the fluid-handling slot is formed utilizing at least one substrate removal process directed at the first substrate surface and at least two different substrate removal processes directed at the second substrate surface.
37. A print cartridge comprising, at least in part, the fluid-ejecting device of claim 34.
38. A micro electro mechanical systems device comprising:
a substrate for supporting overlying layers; and,
at least one feature formed in the substrate, the feature being formed with at least a first substrate removal process and a second different substrate removal process, wherein the second different substrate removal process also removes debris created by the first substrate removal process and wherein the first substrate removal process comprises using a laser beam and the second substrate removal process comprises directing abrasive particles toward the substrate.

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Evidence Appendix

None. There is no extrinsic evidence.

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Related Proceedings Appendix

None. There are no related proceedings.